EFFECTS OF CURRENT SECURITY REGULATIONS ON COMPETITIVE STRATEGIES OF MARITIME INDUSTRY FIRMS IN ASIA

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

The Effects of Current Security Regulations on Competitive Strategies of Maritime Industry Terminal Firms in Asia. (May 2015)

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The effects of current maritime port security regulation implementation on the perceived competitiveness of Asian ports are examined in this study. This project attempts to measure these effects by distributing surveys via email in order to enlarge the scope on prior research concerning European Union and United States maritime port security regulations. This expansion will allow for setting the framework to compare and contrast how ports around the world use their assets and strategize competitively. This project analyzes many features of Asian ports, and this comparative analysis could be beneficial to the ports which can adopt the strategies of the most competitive ports of Asia. The following specific research question will be explored: How do Asian ports' core competencies differ from those in the EU and the U.S. with security measures already in place?

Prior research has studied the effect of EU and U.S. port security regulation on the competitive strategies of maritime industry firms and port infrastructure. This research surveyed EU and U.S. ports to see what each port thought its core competence was in its organization, while this project surveyed Asian ports to compare differences in responses in order to expand upon the findings of

past research (Stone, 2013; Farrell, 2014). This survey was distributed through email, and the contact information for Asian ports was retrieved from Sea-Web Database.

Structured by the Resource-Based Strategic Theory, the survey asks ports to determine whether their assets are unique, valuable, not easily imitated, not easily substituted, specific to that firm, or hold no competitive advantage. In accordance with this theory, this study found that the intangible assets and resources of a port are perceived to give them a competitive advantage, as it compared the physical, technological, planning security, ongoing management resources, financial, and human assets and resources.

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CHAPTER I

INTRODUCTION

Ocean trade constitutes over ninety percent of global trade, making it central to countries' economies around the world; Asian economies make no exception. China alone is the number one exporter of goods in the world. In the present day, more than fifty percent of the world's annual merchant tonnage travels through Southeast Asian waters. Through major trade agreements such as Asia-Pacific Trade Agreement (APTA), shipping has become crucial to most Asian countries' economies, and maximizing efficiency and the use of competitive strategies in Asian ports is imperative.

Because of how important ocean trade has become to the world economy, international security measures have been adopted in order to maintain safety and security in marine transportation. The International Maritime Organization adopted the International Ship and Port Security Code (ISPS) in December 2002, setting the requirements for governments, port authorities and shipping companies to ensure this safety and security in ports around the world. The security measures adopted by the ISPS Code changed the way ports around the world operated, and Asian ports have adopted these measures in order to protect the assets brought by maritime commerce. Compliance with these measures has meant the addition of infrastructure to some ports, such as fencing and scanners. In this project, we will research whether port security measures such as the ISPS code have encouraged or retarded the competitiveness of Asian ports.

Like Farrell and Stone, Resource-Based Strategic Theory acts as a framework for this research project. In strategic management, this theory is used to assess the competitive strategies of firms (Habbershon, 1999). It categorizes the resources belonging to a firm into the tangible and intangible, and it lays the foundation to develop a strategy to maximize the value of those resources to the firm, thereby claiming that certain assets can give a firm a competitive advantage if those resources fit in the "VRIN" criteria of Valuable, Rare, Inimitable, and Not-easily-substitutable. In the surveys distributed, the subjects are asked whether certain resources are VRIN in their port. The type of resources which are included in the survey include tangible assets, such as fencing and other technologies, and intangible assets, such as employee knowledge and safety culture.

The findings of this project will allow for a comparison between how EU and U.S. and Asian ports view their assets, expounding upon prior research.

CHAPTER II

LITERATURE REVIEW

The framework for this project, the Resource-based Theory, was developed from various studies in the field of Strategic Management, although the advancements made Jay Barney's 1991 paper "Firm Resources and Sustained Competitive Advantage" established the importance of the theory in its field. In it, he identified four characteristics that a firm's resources must possess in order to create a competitive advantage for the firm by improving its efficiency and effectiveness. These four attributes identified were that a resource must be valuable, rare, imperfectly imitable and non-substitutable. Together, these characteristics were known as "VRIN."

In this framework, a resource is "Valuable" if it adds value to the firm by allowing it to increase its efficiency and effectiveness. A resource is "Rare" if it is unique and cannot be acquired by many competitors. A resource is "inimitable" if there are significant barriers to creating a similar or substitutable product, such as cost or legal conditions. If a resource is "non-substitutable," there are no functional substitutes for it.

Expanding upon Barney's work (1991), Sirmon (2008) presented the idea that in addition to possessing these VRIN resources, a firm must be able to "effectively bundle and deploy and organization's resources for an advantage to be realized." In this, Sirmon expressed the theory that although a firm has VRIN resources, it must be able to effectively exploit these resources in

order for the competitive advantage to actually be gained. In effect, proper management is crucial for VRIN resources to be effective.

In the maritime industry, this theory has been used as the framework for several studies. In 2004, Chia-Chan Chouab and Pao-Long Chang utilized the theory in their work "Core Competence and Competitive Strategy of the Taiwan Shipbuilding Industry: A Resource-Based Approach." In 2005, John R.M. Gordon, Pui-Mun Lee, and Henry Lucas implemented it in their research titled "A resource-based view of competitive advantage at the Port of Singapore."

In this research project, resource-based theory is utilized to construct the questions on the survey instrument. These questions are addressed to managers of ports in an attempt to measure the perceived competitive advantage certain resources provide to their respective ports. The research is based on managers' perceptions because information identifying components which allow for competitive advantage is not easily disclosed.

The security measures referred to in this project are the regulations of the International Ship and Port Facility Security Code (ISPS). Created by the International Maritime Organization (IMO) in 2002, the ISPS Code is a "comprehensive set of measures to enhance the security of ships and port facilities" (IMO, 2016). It was implemented to enhance maritime security in the International Convention for the Safety of Life at Sea (SOLAS). The purpose of ISPS is to standardize security measures around the world in order to efficiently evaluate risk. (IMO, 2016).

In line with Resource-based theory, the resources identified in this study are categorized into physical assets, ongoing management assets, planning and structuring management, human assets, technological assets, intangible assets, and financial assets. According to Farrell (2014), upon reviewing the port security best practices of the United States Coast Guard (USCG, 2014), physical resources were identified as including physical structures, perimeter barriers, lighting, screening and detection devices, towers, fencing, turnstiles, anti-vehicle barricades, and uniforms. Ongoing management systems were identified as to include communication systems, documentation and security report systems, patrolling systems, access systems, cargo tracking systems, security and access procedures, security incentive systems, warning and alarm systems, and checklists. Planning and structuring management resources identified security planning systems, assessment systems, dual usage asset system, brainstorming session system and security logistics design. Human resources identified employee knowledge, employee experience, employee training systems, guard forces, trained canine units, and drill exercises. Technological resources identified biometrics, software protection, electronic access control, electronic surveillance, electronic and automatic tracking and enterprise resource planning systems (ERP). Intangible assets include location, capacity, complementary infrastructure, third-party security contracts, relationships with local fishermen, safety culture, and union relationships and outreach relationships. Financial resources include port security fees, other revenue generation for security and safety, and cost savings from security compliance (USCG, 2014).

CHAPTER III

METHODOLOGY

This project aims to measure port managers' perceptions on the competitiveness of the usage of their security resources. Accordingly, the chosen method of collecting this data is distributing a survey which can question the recipients' perceptions of their respective ports' competitive advantage in their management of security resources. Specifically, they are asked about the "VRIN" of their security resources, capabilities, and competencies.

According to Fowler (1993), these questions must be "embedded within the theory [of Resource-Based Strategic Theory] to have both reliability and validity." Furthermore, the three main concerns for a research method such as this would be that confidence in the accuracy and non-bias of collected information is necessary, that the information measured across the studies is comparable, and that the collected data is consistent with data sources that do not use the same methods of data collection. In order to comply with these concerns, several steps were taken.

Firstly, the population to be surveyed was determined, and the relevant ports were identified. IHS Fairplay, which is the international database for maritime information and data renowned for its legitimacy and high quality of service, provides a list of all registered maritime ports, and it was through this source that the recipients were identified. All Asian countries with registered maritime ports were chosen as recipients. Three hundred fifty-two ports were identified as being relevant Asian ports in operation. These included the countries of China, Japan, South Korea, India, Indonesia, Philippines, Turkey, Malaysia, Vietnam, Thailand, UAE, Iran, Hong Kong,

Saudi Arabia, Taiwan, Kuwait, Lebanon, Singapore, Yemen, Sri Lanka, Oman, Myanmar, Qatar, Pakistan, Israel, Cambodia, Bahrain, Kazakhstan, Brunei, Syria, Iraq, Bangladesh, Turkmenistan, Jordan, Tajikistan, Azerbaijan, Maldives, Laos, Uzbekistan, and Kyrgyzstan. Because all identified ports were sent a survey, this relieves the bias on this end.

Secondly, in order to ensure comparability of data across studies, the survey to be released was the survey distributed to United States ports in Farrell's "The Effects of Port Security Compliance on the Competitiveness of United States and European Union Ports and Maritime Industry Terminal Firms." This survey was compiled by stakeholders including "port authority managers, terminal operators, consultants, Baltic and International Maritime Council (BIMCO) officers, US Coast Guard operation officers, NATO officers, European industry journalists academic experts on port security and on Resource-based strategic theory." This survey asks respondents to identify whether certain security resources are "VRIN" by asking them to indicate where these resources belong in the categories of valuable, rare, inimitable, and non-substitutable.

Japanese, Korean, and Chinese ports were determined to be critical respondents, so the original English survey was translated to Japanese, Korean, and Chinese by a translation firm.
The chosen distribution method is email, as snail mail was an inefficient option. The surveys were distributed to the appropriate emails, as provided by IHS Fairplay's *Sea Web,* which provides the contact information for all port managers and administrators. Before distributing the survey, compliance with the 1981 US law for the Protection of Human Subjects (Title 45, Part 46) had to be completed. This ensures that all data collected would be confidential and voluntary.

The total number of Asian countries surveyed was 352 in 40 countries. The total number of U.S. ports surveyed in Farrell's study (2014) was 176 in 22 states. The total number of E.U. ports surveyed in Stone's study (2013) was 1,068 in 22 countries. All relevant ports were surveyed with the same questions, alleviating any bias.

In this study, there was a 6.81% response rate. In Stone's 2013 E.U. study, there was a 5.52% response rate. In Farrell's 2014 U.S. study, there was a 10.8% response rate. There were twenty-four responses, and sixteen countries responded. However, studies have shown that the average response rate for email surveys conducted by industries is approximately 6 to 13.35%, according to Tse (1995). The response rate for this study is within this range, so concern for bias is alleviated.

Lastly, in order to guarantee that the results would be comparable across studies, validity, which is the ability of a question to measure what it aims to measure, and reliability, which is the ability of the question to provide consistent measures in comparable situations (Academic.Luzerne.Edu, 2005), must be addressed. This was done by testing the survey on a sample of E.U. port and terminal managers (Stone, 2013). Feedback concerning the wording and importance of questions and recommendations on who should be surveyed based on knowledge and willingness to respond were received. Because of this exchange, the survey is considered valid. Reliability, on the other hand, was established by asking all respondents the same questions using the same survey instruments. This alleviated bias in this respect.

CHAPTER III

RESULTS

The results were divided into the VRIN criteria. Physical resources, ongoing management resources, planning and structuring management resources, technological assets, intangible assets, and financial assets were included as categories. The results of the survey for Asian ports are found in Table 1. Farrell's results for U.S. ports are found in Table 2. Stone's results for E.U. ports are found in Table 3.

For Asian ports, the results regarding physical security resources varied slightly from the U.S. and E.U. results. While the U.S. results contended that the majority of port managers did not consider these resources to provide a competitive advantage, the results for Asian ports were more similar to that of the E.U. because structures and were considered to give a competitive advantage in both studies. In addition, fencing and anti-vehicle barricades were deemed by the majority of survey participants to provide a competitive advantage, as they both were classified as valuable, rare, inimitable, and non-substitutable.

For ongoing management resources, all resources except access systems and warning and alarm systems were considered by the majority of survey takers to not provide a competitive advantage, whereas in the U.S. and E.U., some ongoing management resources were also found to give no advantage.

In planning and structuring management resources, all resources did not provide a competitive advantage according to respondents, with the exception of assessment systems, which provided that 50.00% of respondents believed so as well. In human assets and resources, the only resources that were deemed to have an advantage are employee training systems and employee experience. There resources also fit the VRIN criteria.

In technological assets, the results were comparable to the E.U. results. This study found that electronic access control and electronic surveillance were perceived to give an advantage. This was also found in the E.U. Both resources fit the VRIN criteria.

Intangible assets showed, in conjunction with the results of the U.S. and E.U. studies, that these resources are important to ports. All resources, excluding relationships with local fishermen and third party security, were found to give a competitive advantage to the port. This is also true of the U.S. study. In the E.U. study, there is also a designation of third party security as non-competitive.

Finally, in this study, all financial assets were deemed by the majority of respondents to not provide an advantage to the competitiveness of the port.

Table 1. Asian Port and Terminal Operator Responses

Physical Resources	**Valuable**	**Rare**	**Not Easily Imitated**	**Not Substitutable**	**Total Advantage**	**No Advantage**	**Total**
Structures	16.67%	8.33%	12.50%	12.50%	50.00%	50.00%	100.00%

Physical and Perimeter Barriers	12.50%	16.67%	8.33%	8.33%	45.83%	54.17%	100.00%
Lighting	41.67%	16.67%	4.17%	4.17%	33.33%	66.67%	100.00%
Screening and Detection Devices	12.5%	29.17%	4.17%	0.00%	45.83%	54.17%	100.00%
Towers	12.5%	8.33%	4.17%	4.17%	29.17%	70.83%	100.00%
Fencing	29.17%	8.33%	12.50%	8.33%	58.33%	41.67%	100.00%
Turnstiles	20.83%	4.17%	4.17%	8.33%	37.50%	62.50%	100.00%
Anti-vehicle barricades	33.33%	16.67%	4.17%	4.17%	58.33%	41.67%	100.00%
Uniforms	4.17%	16.67%	4.17%	8.33%	33.33%	66.67%	100.00%
Ongoing Management Resources							
Communication Systems	12.5%	20.83%	4.17%	4.17%	41.67%	58.30%	100.00%
Documentation and Security Reports	16.67%	29.17%	0.00%	16.67%	45.83%	54.17%	100.00%
Patrolling Systems	8.33%	12.50%	8.33%	4.17%	33.33%	66.67%	100.00%
Access Systems	33.33%	12.50%	12.50%	4.17%	62.5%	37.5%	100.00%
Cargo Tracking Systems	20.83%	8.33%	4.17%	12.50%	45.83%	54.17%	100.00%
Security and Access Procedures	4.17%	16.67%	4.17%	12.50%	37.5%	62.5%	100.00%
Security Incentive Systems	12.50%	20.83%	0.00%	4.17%	33.33%	66.67%	100.00%
Warning and Alarm Systems	25.00%	12.50%	16.67%	4.17%	58.33%	41.67%	100.00%
Checklists	12.50%	8.33%	8.33%	16.67%	45.83%	54.17%	100.00%

Planning and Structuring Management Resources							
Security Planning Systems	16.67%	12.50%	4.17%	8.33%	41.67%	58.30%	100.00%
Assessment Systems	29.17%	12.50%	4.17%	4.17%	50.00%	50.00%	100.00%
Dual Usage Asset Plans	8.33%	12.50%	4.17%	16.67%	41.67%	58.30%	100.00%
Brainstorming Session System	4.17%	8.33%	12.50%	12.50%	37.50%	62.5%	100.00%
Security Logistics Design	12.50%	8.33%	16.67%	8.33%	45.83%	54.17%	100.00%
Human Assets/ Resources							
Employee Knowledge	12.50%	4.17%	0.00%	12.50%	29.17%	70.83%	100.00%
Employee Experience	29.17%	20.83%	4.17%	12.50%	66.67%	33.33%	100.00%
Employee Training Systems	12.50%	20.83%	12.50%	4.17%	50.00%	50.00%	100.00%
Guard Forces	8.33%	8.33%	12.5%	0.00%	29.17%	70.83%	100.00%
Trained Canine Units	0.00%	8.33%	0.00%	4.17%	12.50%	87.50%	100.00%
Drills	16.67%	4.17%	12.50%	4.17%	37.50%	62.50%	100.00%
Exercises	16.67%	0.00%	4.17%	8.33%	29.17%	70.83%	100.00%
Technological Assets							
Biometrics	8.33%	8.33%	4.17%	12.50%	33.33%	66.67%	100.00%
Software Protection	8.33%	20.83%	8.33%	4.17%	41.67%	58.30%	100.00%
Electronic Access Control	12.50%	4.17%	16.67%	20.83%	54.17%	45.83%	100.00%
Electronic Surveillance	4.17%	29.17%	29.17%	8.33%	70.83%	29.17%	100.00%

Electronic and Automatic Tracking	16.67%	8.33%	0.00%	12.50%	37.50%	62.50%	100.00%
Enterprise Resource System	12.50%	16.67%	8.33%	4.17%	41.67%	58.30%	100.00%
Intangible Assets							
Location	29.17%	16.67%	16.67%	12.50%	75.00%	25.00%	100.00%
Capacity	25.00%	33.33%	8.33%	16.67%	83.33%	16.67%	100.00%
Complementary infrastructure	8.33%	16.67%	25.00%	8.33%	58.33%	41.67%	100.00%
Third-party security	8.33%	20.83%	12.50%	4.17%	45.83%	54.17%	100.00%
Relationships with local fishermen	12.50%	4.17%	0.00%	12.50%	29.17%	70.83%	100.00%
Safety culture	12.50%	16.67%	20.83%	16.67%	66.67%	33.33%	100.00%
Union Relationships	8.33%	12.50%	16.67%	16.67%	54.17%	45.83%	100.00%
Outreach relationships	16.67%	20.83%	8.33%	12.50%	58.33%	41.67%	100.00%
Financial Assets							
Port Security Fees	4.17%	8.33%	8.33%	16.67%	41.67%	58.33%	100.00%
Other Revenue Generation for Security and Safety	0.00%	8.33%	12.50%	0.00%	20.83%	79.17%	100.00%
Cost Savings from Security Compliance	16.67%	12.50%	0.00%	12.50%	41.67%	58.3%	100.00%

For the results of the U.S. port and terminal operations as displayed in Table 2, Farrell (2014) found that a majority of U.S. port and terminal operators do not believe that physical security assets provide any competitive advantage, illustrated by the greater percentage of those who

believe that these resources do not provide a competitive advantage. Turnstiles are found to be not easily substitutable and not easily imitated, but the majority found that they did not provide an advantage. Towers are deemed to be rare.

In Farrell's study (2014), some ongoing management resources were observed to provide a competitive advantage. Communication systems, documentation and security reports, patrolling systems, and checklists were deemed by 50.00% of the participants to provide a competitive advantage. Fifty percent of the survey participants believe that these resources do not provide a competitive advantage. The remaining resources listed under this category were perceived by a majority of the participants to give no competitive advantage.

In this same study, the majority of participants also identified planning and structuring management resources as providing no advantage. Only security planning systems were identified by 50.00% of participants to provide a competitive advantage. Technological assets were also deemed by a majority of participants to not give any competitive advantage. A strong majority, 75.00%, believe that enterprise resource planning systems do not provide a competitive advantage.

Intangible assets were deemed to provide significant competitive advantage. Capacity, for example, was considered by 75.00% of the participants to provide a competitive advantage. Almost all listed resources under this category were perceived to give a competitive advantage, including outreach relationships and safety culture.

Financial Assets were perceived by the majority of participants to not give a competitive advantage. These resources include port security fees and cost savings from security compliance.

Table 2. U.S. Port and Terminal Operators Survey Responses

Physical Resources	**Valuable**	**Rare**	**Not Easily Imitated**	**Not Substitutable**	**Total Advantage**	**No Advantage**	**Total**
Structures	14.29%	14.29%	7.14%	0.00%	35.71%	64.29%	100.00%
Physical and Perimeter Barriers	14.29%	21.43%	7.14%	0.00%	42.86%	57.14%	100.00%
Lighting	7.14%	21.43%	0.00%	14.29%	42.86%	57.14%	100.00%
Screening and Detection Devices	7.14%	21.43%	0.00%	14.29%	42.86%	57.14 %	100.00%
Towers	0.00%	7.14%	0.00%	0.00%	7.14%	92.86	100.00%
Fencing	0.00%	26.67%	0.00%	13.33%	40.00%	60.00%	100.00%
Turnstiles	0.00%	0.00%	7.69%	7.69%	15.38%	84.62%	100.00%
Anti-vehicle barricades	7.69%	15.38%	0.00%	15.38%	38.46%	61.54%	100.00%
Uniforms	0.00%	7.14 %	7.14%	14.29%	28.57%	71.43%	100.00%
Ongoing Management Resources							
Communication Systems	7.14%	14.43%	21.43%	7.14%	50.00%	50.00%	100.00%
Documentation and Security Reports	0.00%	21.43%	14.29%	14.29%	50.00%	50.00%	100.00%
Patrolling Systems	0.00%	28.57%	7.14%	14.29%	50.00%	50.00%	100.00%
Access Systems	0.00%	21.43%	14.29%	0.00%	35.71%	64.29%	100.00%

Cargo Tracking Systems	0.00%	7.14%	7.14%	14.29%	28.57%	71.43%	100.00%
Security and Access Procedures	0.00%	13.33%	13.33%	6.67%	33.33%	66.67%	100.00%
Security Incentive Systems	0.00%	14.29%	14.29%	7.14%	35.71%	64.29%	100.00%
Warning and Alarm Systems	0.00%	35.71%	0.00%	7.14%	42.86%	57.14%	100.00%
Checklists	0.00%	35.71%	0.00%	14.29%	50.00%	50.00%	100.00%
Planning and Structuring Management Resources							
Security Planning Systems	0.00%	28.57%	21.43%	0.00%	50.00%	50.00%	100.00%
Assessment Systems	0.00%	7.69%	23.08%	7.69%	38.46%	61.54%	100.00%
Dual Usage Asset Plans	0.00%	7.69%	23.08%	7.69%	38.46%	61.54%	100.00%
Brainstorming Session System	0.00%	7.69%	15.38%	15.38%	38.46%	61.54%	100.00%
Security Logistics Design	0.00%	8.33%	16.67%	8.33%	33.33%	66.67%	100.00%
Human Assets/ Resources							
Employee Knowledge	30.77%	15.38%	0.00%	0.00%	46.15%	53.85%	100.00%
Employee Experience	23.08%	30.77%	0.00%	0.00%	53.85%	46.15%	100.00%
Employee Training Systems	7.69%	23.08%	7.69%	0.00%	38.46%	61.54%	100.00%
Guard Forces	0.00%	7.69%	0.00%	7.69%	15.38%	84.62%	100.00%
Trained Canine Units	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Drills	7.14%	14.29%	7.14%	7.14%	37.71%	64.29%	100.00%
Exercises	7.69%	15.38%	7.69%	7.69%	38.46%	61.54%	100.00%

Technological Assets							
Biometrics	9.09%	0.00%	9.09%	0.00%	18.18%	81.82%	100.00%
Software Protection	8.33%	16.67%	8.33%	8.33%	41.67%	58.33%	100.00%
Electronic Access Control	8.33%	8.33%	8.33%	8.33%	33.33%	66.67%	100.00%
Electronic Surveillance	0.00%	8.33%	8.33%	25.00%	41.67%	58.33%	100.00%
Electronic and Automatic Tracking	0.00%	8.33%	0.00%	25.00%	33.33%	66.67%	100.00%
Enterprise Resource System	8.33%	8.33%	0.00%	8.33%	25.00%	75.00%	100.00%
Intangible Assets							
Location	7.14%	57.14%	0.00%	7.14%	71.43%	28.57%	100.00%
Capacity	25.00%	25.00%	16.67%	8.33%	75.00%	25.00%	100.00%
Complementary infrastructure	7.69%	30.77%	15.38%	7.69%	61.54%	38.46%	100.00%
Third-party security	8.33%	8.33%	8.33%	16.67%	41.67%	58.33%	100.00%
Relationships with local fishermen	25.00%	8.33%	0.00%	0.00%	33.33%	66.67%	100.00%
Safety culture	15.38%	23.08%	15.38%	15.38%	69.23%	30.77%	100.00%
Union Relationships	15.38%	23.08%	15.38%	0.00%	53.85%	46.15%	100.00%
Outreach relationships	30.77%	30.77%	7.69%	7.69%	76.92%	23.08%	100.00%
Financial Assets							
Port Security Fees	0.00%	16.67%	0.00%	0.00%	16.67%	83.33%	100.00%
Other Revenue Generation for Security and Safety	0.00%	10.00%	10.00%	0.00%	20.00%	80.00%	100.00%

Cost Savings from Security Compliance	0.00%	15.38%	7.69%	0.00%	23.08%	76.92%	100.00%

As displayed in Table 2, Stone (2013) found that E.U. port and terminal operators perceive that some physical security resources provide a competitive advantage. All listed physical resources were deemed to be valuable, rare, not easily imitated, and not substitutable, while some participants perceive the resources to give no competitive advantage at all.

Ongoing management security resources are found by the majority of participants to provide no competitive advantage, except for documentation and security reports, which were found 51.28% of participants to provide a competitive advantage. In the U.S., this resource was found by 50.00% of participants to give a competitive advantage. Communication systems, patrolling systems, access systems, checklists, warning and alarm systems, and security and access procedures are all considered VRIN because they are considered valuable, rare, inimitable, and non-substitutable.

Planning and structuring management resources in the E.U. study were not deemed by the majority of participants to provide a competitive advantage. However, assessment systems and security planning systems were perceived by slightly less than the majority. Although security logistics was not perceived to be valuable, it was perceived to be rare, inimitable, and non-substitutable.

In human assets and resources, employee knowledge, employee training systems, guard forces, trained canine units, drills, and exercises were deemed to be valuable, rare, inimitable, and non-substitutable. A majority of participants believed that these resources did provide a competitive advantage, with the exception of trained canine units, for which 63.33% of participants identified no competitive advantage.

In technological assets, Stone (2013) found mixed results. In the instance of biometrics, electronic and automatic tracking, and enterprise resource planning systems, the majority of participants found that these resources did not provide a competitive advantage. In the categories of software protection, electronic access control, and electronic surveillance, the majority of surveyed managers found that these resources did give a competitive advantage. All of these resources were deemed to be valuable, rare, inimitable, and non-substitutable.

In intangible assets, only third-party security and relationships with local fishermen were not considered by the majority to give a competitive advantage. The other resources, including location, capacity, complementary infrastructure, safety culture, and union relationships were perceived to provide a competitive advantage. All listed intangible assets were considered valuable, rare, inimitable, and non-substitutable (VRIN). In this aspect, it is similar to the U.S. and Asia because intangible assets are identified as being crucial components of gaining a competitive advantage.

Table 3. EU Port and Terminal Operators Survey Responses

Physical Resources	**Valuable**	**Rare**	**Not Easily Imitated**	**Not Substitutable**	**Total Advantage**	**No Advantage**	**Total**
Structures	10.26%	33.33%	12.82%	2.56%	58.97%	41.03%	100.00%
Physical and Perimeter Barriers	2.63%	28.95%	7.89%	13.16%	52.63%	47.37%	100.00%
Lighting	2.70%	13.52%	5.41%	13.51%	35.14%	64.86%	100.00%
Screening and Detection Devices	7.89%	10.53%	2.63%	7.89%	28.95%	71.05%	100.00%
Towers	3.03%	9.09%	6.06%	15.15%	33.33%	66.67%	100.00%
Fencing	0.00%	21.05%	5.26%	7.89%	34.21%	65.79%	100.00%
Turnstiles	3.03%	9.09%	6.06%	9.09%	27.27%	72.73%	100.00%
Anti-vehicle barricades	6.45%	6.45%	9.68%	6.45%	29.03%	70.97%	100.00%
Uniforms	5.41%	16.22%	5.41%	10.81%	37.84%	62.16%	100.00%
Ongoing Management Resources							
Communication Systems	7.69%	20.51%	15.38%	2.56%	46.15%	53.85%	100.00%
Documentation and Security Reports	10.36%	30.77%	2.56%	7.69%	51.28%	48.72%	100.00%
Patrolling Systems	10.53%	23.68%	5.26%	5.26%	44.74%	55.26%	100.00%
Access Systems	7.89%	18.42%	5.26%	7.89%	39.47%	60.53%	100.00%
Cargo Tracking Systems	10.81%	16.22%	8.11%	5.41%	40.54%	59.46%	100.00%
Security and Access Procedures	5.41%	27.03%	5.41%	5.41%	43.24%	56.76%	100.00%
Security Incentive Systems	5.88%	20.59%	5.88%	5.88%	38.24%	61.76%	100.00%

Warning and Alarm Systems	5.41%	27.03%	2.70%	5.41%	40.54%	59.46%	100.00%
Checklists	2.70%	27.03%	8.11%	5.41%	43.24%	56.76%	100.00%
Planning and Structuring Management Resources							
Security Planning Systems	5.13%	23.08%	10.26%	7.69%	46.15%	53.85%	100.00%
Assessment Systems	7.69%	23.08%	2.56%	7.69%	41.03%	58.97%	100.00%
Dual Usage Asset Plans	2.94%	23.53%	5.88%	5.88%	38.24%	61.76%	100.00%
Brainstorming Session System	2.78%	11.11%	11.11%	11.11%	36.11%	63.89%	100.00%
Security Logistics Design	0.00%	22.86%	5.71%	5.71%	40.00%	60.00%	100.00%
Human Assets/ Resources							
Employee Knowledge	26.32%	21.05%	2.63%	10.53%	60.53%	39.47%	100.00%
Employee Experience	28.21%	23.08%	0.00%	10.26%	61.54%	38.46%	100.00%
Employee Training Systems	10.26%	28.21%	10.26%	2.56%	51.28%	48.72%	100.00%
Guard Forces	8.82%	26.47%	2.94%	8.82%	47.06%	52.94%	100.00%
Trained Canine Units	10.00%	16.67%	3.33%	6.67%	36.67%	63.33%	100.00%
Drills	5.26%	28.95%	10.53%	5.26%	50.00%	50.00%	100.00%
Exercises	7.69%	30.77%	5.13%	7.69%	51.28%	48.72%	100.00%
Technological Assets							
Biometrics	10.00%	16.67%	3.33%	6.67%	36.67%	63.33%	100.00%
Software Protection	9.09%	30.30%	6.06%	12.12%	57.58%	42.42%	100.00%
Electronic Access Control	14.29%	28.57%	2.86%	8.57%	54.29%	45.71%	100.00%

Electronic Surveillance	11.43%	31.43%	2.86%	8.57%	54.29%	45.71%	100.00%
Electronic and Automatic Tracking	9.38%	21.88%	6.25%	9.38%	46.88%	53.13%	100.00%
Enterprise Resource System	6.25%	21.88%	6.25%	9.38%	43.75%	56.25%	100.00%
Intangible Assets							
Location	35.29%	29.41%	5.88%	5.88%	76.47%	23.53%	100.00%
Capacity	33.33%	25.00%	5.56%	5.56%	69.44%	30.56%	100.00%
Complementary infrastructure	22.22%	25.00%	5.56%	11.11%	63.89%	36.11%	100.00%
Third-party security	14.71%	11.76%	2.94%	5.88%	35.29%	64.71%	100.00%
Relationships with local fishermen	17.65%	26.47%	5.88%	5.88%	55.88%	44.12%	100.00%
Safety culture	19.44%	25.00%	5.56%	11.11%	61.11%	38.89%	100.00%
Union Relationships	17.14%	25.71%	5.71%	17.14%	65.71%	34.29%	100.00%
Outreach relationships	14.71%	26.47%	14.71%	11.76%	67.65%	32.35%	100.00%
Financial Assets							
Port Security Fees	5.56%	19.44%	5.56%	5.56%	36.11%	63.89%	100.00%
Other Revenue Generation for Security and Safety	3.03%	18.18%	12.12%	6.06%	39.39%	60.61	100.00%
Cost Savings from Security Compliance	14.29%	17.14%	2.86%	5.71%	40.00%	60.00%	100.00%

CHAPTER V

CONCLUSION

Ports around the world use their assets and resources in different ways. In maritime security regulation, successful compliance with these laws must collaborate with strategic management in order to make a port competitive, an issue which is important to maritime commerce strategy around the world.

This study has enlarged the scope of prior research dealing with analyses on how ports comply with these regulations in the European Union and United States and how these methods affect competition. In all three studies, it was found that intangible assets and resources are perceived to give ports a competitive advantage, as it compared the physical, technological, planning security, ongoing management resources, financial, and human assets and resources. This conclusion exists in accordance with Resource-Based Strategic Theory as the framework for this project.

REFERENCES

Academic.luzerne.edu. (2005). T*est validity and reliability: What do the numbers mean?*. Retrieved from http://academic.luzerne.edu/staffdece/valrel.html

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of management,17(1), 99-120.

Chou, C. and Chang, P. (2004). Core competence and competitive strategy of the Taiwan shipbuilding industry: a resource-based approach. Maritime Policy & Management. 31(2).

Farrell, T. (2014). *The effects of port security compliance on the competitiveness of united states and European union ports and maritime industry terminal firms*. (Unpublished undergraduate thesis, Texas A&M University at Galveston).

Fowler, F.J. Jr. (1993). S*urvey research methods*. (2nd ed). Newbury Park: Sage Publications.

Habbershon, T. G. and Williams, M. L. (1999). A Resource-Based Framework for Assessing the Strategic Advantages of Family Firms. Family Business Review, 12: 1–25. doi: 10.1111/j.1741-6248.1999.00001.x

Hitt, M.A., Ireland, R.D., & Sirmon, D.G. (2007). Managing firm resources in dynamic environments to create value: looking inside the black box. *Academy of Management Review, 32*(1), 273-292.

International Maritime Organization. (2016). International ship and port facility decurity code and solas amendments. (pp. 6-7). London, United Kingdom: International Maritime Organization.

Mills, D. Q. (2005,). Asian and american leadership styles: How are they unique?. Message posted to http://hbswk.hbs.edu/item/asian-and-american-leadership-styles-how-are-they-unique

Sirmon, D.G., Gove, S., & Hitt, M.A. (2008). Contingencies within dynamic managerial capabilities: Interdependent effects of resource investment and deployment on firm performance. *Strategic Management Journal*, 30, 1375-1394. doi: 10.1002/smj.791

Southeast china: Trends in U.S. and chinese economic engagement(2015). (Report to Congressional Requesters No. GAO-15-724)United States Government Accountability Office.

Stone, J. (2013). *The effects of European union regulations regarding port security on the competitive strategy of maritime industry firms and port infrastructure*. (Unpublished master's thesis, Texas A&M University at Galveston).

Tse, A., Tse, K.C., Yin, C.H., Ting, C.B., Yi, K. W., Yee, K. P., & Hong, W.C. (1995). Comparing two methods of sending out questionnaires: Email versus mail. *Journal of the Market Research Society*, 4(37), 441-445.

United States Coast Guard. (2014, April 14). Bp type- training & procedures. Retrieved from https://homeport.uscg.mil/mycg/portal/ep/programView.doc?channelId=-18389&programId=50386&programPage=/ep/program/editorial.jsp&pageTypeId=13489